

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strike through~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Please AMEND claims 1-10 and ADD new claims 11-18 in accordance with the following:

1. (CURRENTLY AMENDED) An optical AND gate ~~including~~ comprising:

a nonlinear optical medium ~~for~~ inputting signal light having a first wavelength and probe light having a second wavelength different from the first wavelength and producing cross phase modulation of the probe light with the signal light to thereby output spectrally broadened light; and

an optical filter ~~for~~ extracting light including a modulated component of the signal light and having a band narrower than the band of the spectrally broadened light, from the spectrally broadened light,

wherein a band of said first wavelength and said second wavelength are not included in the band of said optical filter.

2. (CURRENTLY AMENDED) A waveform shaping device comprising including:
an optical AND gate comprising:

a nonlinear optical medium inputting signal light having a first wavelength and probe light having a second wavelength different from the first wavelength and producing cross phase modulation of the probe light with the signal light to thereby output spectrally broadened light; and

an optical filter extracting light including a modulated component of the signal light and having a band narrower than the band of the spectrally broadened light, from the spectrally broadened light;

a second nonlinear optical medium ~~for~~ inputting output light from an optical AND gate ~~according to claim 1~~ and producing self phase modulation of the output light from the optical AND gate to thereby output second spectrally broadened light; and

a second optical filter ~~for~~ extracting light including a signal component of the output light from the optical AND gate and having a band narrower than the band of the second spectrally broadened light, from the second spectrally broadened light.

3. (CURRENTLY AMENDED) A waveform shaping device comprising including:
an optical AND gate comprising:

a nonlinear optical medium inputting signal light having a first wavelength and probe light having a second wavelength different from the first wavelength and producing cross phase modulation of the probe light with the signal light to thereby output spectrally broadened light; and

an optical filter extracting light including a modulated component of the signal light and having a band narrower than the band of the spectrally broadened light, from the spectrally broadened light;

a second nonlinear optical medium ~~for~~ inputting output light from an optical AND gate ~~according to claim 1~~ and second probe light having a wavelength different from the wavelength of the output light from the optical AND gate and producing cross phase modulation of the second probe light with the output light from the optical AND gate to thereby output second spectrally broadened light; and

a second optical filter ~~for~~ extracting light including a signal component of the output light from the optical AND gate and having a band narrower than the band of the second spectrally broadened light.

4. (CURRENTLY AMENDED) A waveform shaping device comprising
an optical AND gate;

a nonlinear optical medium ~~for~~ inputting output light from the optical AND gate and probe light having a wavelength different from the wavelength of the output light from the optical AND gate and producing cross phase modulation of the probe light with the output light from the optical AND gate to thereby output spectrally broadened light; and

an optical filter ~~for~~ extracting light including a signal component of the output light from the optical AND gate and having a band narrower than the band of the spectrally broadened light, from the spectrally broadened light,

wherein a band of said first wavelength and said second wavelength are not included in the band of said optical filter.

5. (CURRENTLY AMENDED) ~~An optical AND gate or a~~ The waveform shaping device according to claim 1, 2 or, 3, ~~or~~ 4, wherein the signal light and the probe light to be input into the optical AND gate are light obtained by broadening the pulse width of signal light from a transmission line and an optical clock extracted from the signal light from the transmission line,

respectively.

6. (CURRENTLY AMENDED) ~~The An optical AND gate or a~~ waveform shaping device according to claim 1, 2 or 3, or 4, wherein the nonlinear optical medium is a single-mode optical fiber.

7. (CURRENTLY AMENDED) A waveform shaping method ~~including the steps of~~ comprising:

inputting signal light having a first wavelength and probe light having a second wavelength different from the first wavelength into a nonlinear optical medium and producing cross phase modulation of the probe light with the signal light in the nonlinear optical medium to thereby output spectrally broadened light; and

extracting light including a modulated component of the signal light and having a band narrower than the band of the spectrally broadened light, from the spectrally broadened light, wherein a band of said first wavelength and said second wavelength are not included in the band of the extracted light.

8. (CURRENTLY AMENDED) A waveform shaping method ~~including the steps of~~ comprising:

inputting output light obtained by ~~a method according to claim 7~~ inputting signal light having a first wavelength and probe light having a second wavelength different from the first wavelength into a nonlinear optical medium and producing cross phase modulation of the probe light with the signal light in the nonlinear optical medium to thereby output spectrally broadened light; and extracting light including a modulated component of the signal light and having a band narrower than the band of the spectrally broadened light, from the spectrally broadened light into a second nonlinear optical medium and producing self phase modulation of the output light to thereby output second spectrally broadened light; and

extracting light including a signal component of the output light and having a band narrower than the band of the second spectrally broadened light, from the second spectrally broadened light.

9. (CURRENTLY AMENDED) A waveform shaping method ~~including the steps of~~ comprising:

inputting output light obtained by ~~a method according to claim 7~~ inputting signal light

having a first wavelength and probe light having a second wavelength different from the first wavelength into a nonlinear optical medium and producing cross phase modulation of the probe light with the signal light in the nonlinear optical medium to thereby output spectrally broadened light; and extracting light including a modulated component of the signal light and having a band narrower than the band of the spectrally broadened light, from the spectrally broadened light and
 second probe light having a wavelength different from the wavelength of the output light into a second nonlinear optical medium and producing cross phase modulation of the second probe light with the output light to thereby output second spectrally broadened light; and

extracting light including a signal component of the output light and having a band narrower than the band of the second spectrally broadened light, from the second spectrally broadened light.

10. (CURRENTLY AMENDED) A waveform shaping device ~~including~~ comprising:
 first means for splitting input signal light into first signal light and second signal light;
 second means for waveform-shaping the first signal light to output waveform-shaped light;

third means for extracting an optical clock from the second signal light;

fourth means for inputting the waveform-shaped light and the optical clock, broadening the spectrum of the optical clock under AND conditions to obtain first spectrally broadened light, and extracting a predetermined band from the first spectrally broadened light; and

fifth means for inputting output light from the fourth means, broadening the spectrum of the output light to obtain second spectrally broadened light, and extracting a predetermined band from the second spectrally broadened light.

11. (Original) An optical communication system including a transmitter, a receiver, an optical transmission line for connecting the transmitter and the receiver, and a device according to claim 10 inserted in the optical transmission line.

12. (NEW) The optical AND gate-according to claim 1, wherein the signal light and the probe light to be input into the optical AND gate are light obtained by broadening the pulse width of signal light from a transmission line and an optical clock extracted from the signal light from the transmission line, respectively.

13. (NEW) The optical AND gate-according to claim 1, wherein the nonlinear optical

medium is a single-mode optical fiber.

14. (NEW) The waveform shaping device according to claim 4, wherein signal light and probe light to be input into the optical AND gate are light obtained by broadening the pulse width of signal light from a transmission line and an optical clock extracted from the signal light from the transmission line, respectively.

15. (NEW) The waveform shaping device according to claim 4, wherein the nonlinear optical medium is a single-mode optical fiber.

16. (NEW) The optical AND gate according to claim 1, both edge components of said spectrally broadened light corresponding to the shortest wavelength and the longest wavelength are not included in the band of said optical filter.

17. (NEW) The waveform shaping device according to claim 4, both edge components of said spectrally broadened light corresponding to the shortest wavelength and the longest wavelength are not included in the band of said optical filter.

18. (NEW) The waveform shaping method according to claim 7, both edge components of said spectrally broadened light corresponding to the shortest wavelength and the longest wavelength are not included in the band of the extracted light.